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NEW SOVIET ELECTRIC-POWERED SUCTION DREDGES

1,000-80 DREDGE MANNED BY CREW OF 48 -- Moscow, Mekhanizatsiya Stroitel'stva, Apr 52

Three types of suction dredges have been built in the Soviet Union: the 300-40, rated to pump out 300 cubic meters of earth per hour and move it a distance of 2,000 meters; the 500-60, rated to put out 500 cubic meters of earth per hour and move it 3,000 meters; and the 1,000-80 /rated to product 1,000 cubic meters of earth per hour and pump it a distance of 4 kilometers (see following item)/.

In actual operation, these dredges have considerably exceeded their rated productivity for earth. The 300-40 dredges have pumped out 400-500 cubic meters of earth per hour; 500-60 types have attained an hourly productivity of 900-1,000 cubic meters of earth; and the 1,000-80 can move 1,200 cubic meters of earth per hour.

/Evidence in the later items of this report indicates that in the designating system of these dredges the first number gives their rated productivity in cubic meters of earth per hour, while the second number represents the height in meters to which it can be raised. Since the rated productivity of the 500-60 dredge for pulp is ten times that for earth, a one to ten proportion of earth to water in the pulp, may be assumed: in cases where the dredges exceed their ratings for earth, it may be supposed that the proportion of earth to water is increased./

The 1,000-80 dredge has a metal dredging boom mounted forward. A cutter head, powered by an individual electric motor, is located at the end of the boom. /It agitates the earth on the bottom so that it can be sucked up in water solution.

50X1-HUM

Two metal spuds at the vessel's stern are lowered alternately; they stick into the bottom and serve as pivotal points for the movement of the cutter head. The cutter head is moved back and forth in a broad arc by the action of two electric maneuvering winches, located in the bow, which alternately pull on lines passing through pulleys on the dredging boom and secured to anchors dropped some distance off the bows. The maneuvering winches were built by the Leningrad /Hoist and Transport Equipment/ Plant imeni Kirov.

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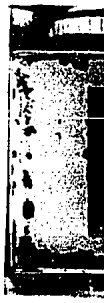

The dredge's suction pump was developed jointly by the Planning and Design Office of the Administration of Hydraulic Mechanization and the All-Union Scientific Research Institute of Hydraulic Machinery. The electric motor powering the suction pump was developed and built at the Sverdlovsk Uralelektroapparat Plant.

A 10-ton overhead traveler inside the superstructure is used for moving and installing heavy equipment. Two 5-ton jib cranes are mounted forward, and two 5-ton hoists are mounted on monorails suspended over the dredging boom.

Control of all the dredge's operations is centralized at a single panel. The vessel is manned by a crew of 58.

The specifications are as follows:

Length of hull (m)	45
Beam (m)	12.2
Height /to main deck/ (m)	3
Draft (m)	1.6
Weight of dredge (tons)	650
Length of dredging boom (m)	26.8
Weight of dredging boom (tons)	95
Diameter of cutter head (m)	2.5
Diameter of spuds (m)	1.02
Capacity of motor powering suction pump (kw)	4,400
Capacity of motor powering cutter head (kw)	300
Traction force of forward maneuvering winches (tons)	25
Traction force of winches for raising spuds (tons)	15

Moscow, Vestnik Mashinostroyeniya, Dec 51

Suction pumps for the 1,000-80 dredges are built by the Sverdlovsk Uralkhimmash Plant, which completed its first eight ahead of schedule. They are of the centrifugal, single-rotor type. The rotor is made of 40-Kh steel, has four blades, and is 2,310 millimeters in diameter. The shaft bearings are of B-83 babbitt metal. Lubrication of the pump is centralized.

The earth extracted by the 1,000-80 dredges is pumped in water solution through flexible tubing mounted on pontoons to the place of deposit.

Specifications of suction pump are as follows:

Productivity (cu m/hr)	
Water	10,000
Earth	1,000
Pressure head (m)	80
Distance earth is moved (km)	4
Maximum dredging reach below water surface (m)	15
Weight (tons)	
Including mounting frame	38
Including electric motor	90
Speed of rotor (rpm)	240-300

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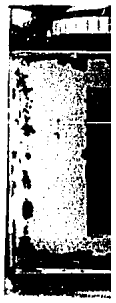

500-60 TYPE PUT INTO OPERATION IN 1950 -- Moscow, Mekhanizatsiya Trudoyemkikh i Tyazhelykh Rabot, May 51

The 500-60 suction dredge, first put into operation in 1950, is similar in design to the 1,000-80 type, differing mainly in size and capacity. It sucks the earth up from the bottom through a boom, and pumps it in water solution through a long pontoon-mounted flexible tube, depositing it on a dam. The deposits of earth build up the dam. The electric centrifugal suction pump, located in the engine room, has a four-bladed rotor running on babbitt-metal bearings. It is connected to its motor through an elastic clutch. In addition to the main suction pump, there are two other electric centrifugal pumps in the engine room. They effect the forced lubrication of working parts and can be used to pump out water in case of flooding. A hand-operated overhead traveling crane in the engine room facilitates work on the machinery.

The dredge is equipped with two welded tubular spuds at the stern; they are raised by individual winches. A second pair of winches, mounted forward, operates the maneuvering cables, which pass through blocks on the suction boom. Another electric winch is used to raise the suction boom. The motors for all the winches may be turned on and off from the bridge, which is situated at the forward end of the superstructure deck.

The hull of the 500-60 is of all-welded steel construction. The dredge has living quarters, a galley, a workshop with three machine tools, and storerooms for spare parts, tools, and materials.

Specifications are as follows:

Length of hull (m)	37
Beam (m)	11
Height to main deck (m)	2.45
Draft, operating condition (m)	1.1
Weight of dredging boom (tons)	76
Reach of dredging boom below water level (m)	15
Diameter of cutter head [at end of dredging boom] (m)	2.5
Cutter head speed (rpm)	18
Power of electric motor operating cutter head (kw)	180
Speed of electric motor operating cutter head (rpm)	720
Capacity of electric winch for raising dredging boom (tons)	10
Suction pump	
Productivity, pulp (cu m/hr)	5,000
Pressure head (m)	60
Rotor diameter (mm)	1,330
Rotor width (mm)	380
Electric motor running suction pump	
Type	Induction
Power (kw)	2,439
Speed (rpm)	500
Voltage	6,600
Auxiliary centrifugal pumps	
Type	4-NDB
Productivity (cu m/hr)	108
Pressure head (m)	100
Power of motor running pumps, power (kw)	80
Length of spuds (m)	28 each
Weight of spuds (tons)	30 each
Capacity of electric winches for hoisting spuds (tons)	10 each
Capacity of electric winches for maneuvering cables (tons)	15 each
Diameter of floating discharge line (mm)	700

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